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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/437,764 11/09/99 YUN

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WM02/0620

EXAMINER

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LIGGETT, J.  
ART UNIT PAPER NUMBER

2662  
DATE MAILED:

06/20/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/437,764	YUN ET AL.	
	Examiner Joe Logsdon	Art Unit 2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_ .
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-7 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claims \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are objected to by the Examiner.
- 11) The proposed drawing correction filed on \_\_\_\_ is: a) approved b) disapproved.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_ .
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

- 15) Notice of References Cited (PTO-892)
- 16) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 6 .
- 18) Interview Summary (PTO-413) Paper No(s) \_\_\_\_ .
- 19) Notice of Informal Patent Application (PTO-152)
- 20) Other: \_\_\_\_\_

**Claim Rejections—35 U.S.C. 102(b):**

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerlach et al. (1993). Gerlach et al. (1993) teaches a closed loop technique in which each mobile user feeds back to the base station estimates of the received signal amplitudes; using this feedback, the base station achieves precision beamforming (abstract). Each of a plurality of base stations sends downlink information signals to each of several mobile stations. Each base station comprises an array of antennae, which is coupled to a beamformer; a beamformer is inherently a signal processor. A total of p probing signals (each probing signal is a type of "downlink pilot signal") are sent from the base station to the mobile station. Each probing signal is determined by a vector of weights (a "weight set"); this vector has dimension m, where m is the number of antennae in the array. The desired beam shape depends on the location of the mobile relative to the base station, and the beam shape is determined by the weight vector; therefore, the weight vector depends on the location of the mobile station relative to the base station. The mobile station measures the amplitude of the probing signals; the amplitude of these signals is a type of signal "quality." The mobile station then "reports" this measured "quality" to the base station before sending back a matrix determined by the amplitudes of the measured probing signals corrupted by zero mean Gaussian noise. At least two probing signals are needed to uniquely determine the

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channel matrix A. The base station assigns the weight vector based on this "report" of "quality." Each probing signal inherently comprises a unique identifier because each different probing signal is represented by a different weight vector; the weight vector can therefore be considered an identifier of the probing signal. (See pages 1432-1434.)

**Claim Rejections—35 U.S.C. 103(a):**

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (1993).

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With regard to claim 4, Gerlach et al. (1993) teaches that each probing signal can be a tone at a single carrier frequency. Gerlach et al. (1993) fails to teach that the probing signals contain identifiers that identify the base stations; that the identifiers identify different base stations; and that the base stations are separated a distance sufficient to assure that pilot signals, which identify a second base station, transmitted from the first base station do not interfere with communication between the second base station and the mobile stations currently communicating with the second base station. It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et al. so that each probing signal contains an identifier, which could, for example, be a specific carrier frequency, of the base station that transmits it and so that adjacent base stations are separated far enough that there is no interference between adjacent cells because such an arrangement allows each mobile station to determine the source of any given probing signal and, therefore, the base station to which the response should be sent.

With regard to claim 5, Gerlach et al. (1993) fails to teach that the mobile station receives at least one pilot signal from another base station, and that the amplitudes of the three pilot signals at the mobile station are used by the base station with which the mobile is currently communicating to determine whether to handoff the mobile station. Examiner takes Official Notice that it has been common practice in the art to arrange a mobile communication system so that the mobile station receives at least one pilot signal from another base station, and so that the amplitudes of the three pilot signals at the mobile station are used by the base station with which the mobile is currently communicating to determine whether to handoff the mobile station. It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et

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al. so that the mobile station receives at least one pilot signal from another base station, and so that the amplitudes of the three pilot signals at the mobile station are used by the base station with which the mobile is currently communicating to determine whether to handoff the mobile station because Examiner takes Official Notice that such an arrangement has been common practice in the art as an arrangement that allows a mobile station to communicate with the base station from which it would receive the highest amplitude signals.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (1993) in view of the Admitted Prior Art. Gerlach et al. (1993) fails to teach that the cellular communication system conforms to the IS-95 standard; that each SU automatically monitors the pilot signals; that the SU generates a report message when the SU determines that one of the pilot signals has a quality that exceeds some threshold; that the report message identifies the pilot signal; and that the set of pilot signals comprises either a Candidate Set, a Neighbor Set, or a Remaining set. The Admitted Prior Art teaches that according to the well-known IS-95 air interface standard an SU monitors these three sets of pilot signals (page 9, lines 24-27); that when a pilot signal from one of these sets has an amplitude that exceeds some threshold a pilot signal measurement message is sent from the SU to the base station; and that the message identifies the pilot signal (page 8, lines 22-25; page 10, lines 18-27). It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et al. so that the cellular communication system conforms to the IS-95 standard; that each SU automatically monitors the pilot signals; that the SU generates a report message when the SU determines that one of the pilot signals has a quality that exceeds some threshold; that the report message identifies the pilot

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signal; and that the set of pilot signals comprises either a Candidate Set, a Neighbor Set, or a Remaining set because such an arrangement would make use of an already existing standard thereby ensuring that the implementation of the system is feasible.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gerlach, Gerlach et al. (1994), Gerlach et al. (U.S. Patent Number 5,634,199), and Wong et al. are cited to show the state of the art.

### **Conclusion**

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Logsdon whose telephone number is (703) 305-2419. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached at (703) 305-4744.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

9. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**Or faxed to:**

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(703) 308-6743

For informal or draft communications, please label "PROPOSED" or "DRAFT".

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA, Sixth Floor (Receptionist).

Joe Logsdon

Patent Examiner

June 10, 2001



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